CHAPTER 3

Initial Switch Router Configurations

This chapter describes how to initially configure the Layer 3 switch routers.

- Starting Up the Layer 3 Switch Router
- Using the Console and the Management Ports
- Configuring the Management Port
- Configuring the Host Name
- Using the Boot Flash Memory SIMM
- Recovering a System Image Using Xmodem and Ymodem
- Updating the System Image

Note You are at Step 2 in the suggested process for configuring your Layer 3 switch router (see Table 2-1 on page 2-1). You should have already set up the hardware before proceeding with the initial switch router configurations.

Starting Up the Layer 3 Switch Router

The following is a review of tasks you should have completed during hardware installation, including starting up the switch router. These tasks must be completed before proceeding with configuring your switch router.

Step 1 Check that the switch router is set for the correct AC (or DC) power voltages.

Refer to the *Catalyst 2948G-L3 Hardware Installation Guide* or the *Catalyst 4908G-L3 Hardware Installation Guide* for correct power voltages.

Step 2 Connect the cables to the switch router.

Step 3 Connect the console terminal to the switch router.

Step 4 Power on the switch router.

Step 5 Enter CLI configuration mode by answering **no** when you are prompted to enter the initial dialog:

```
Would you like to enter the initial dialog? [yes]: no
```

You see the following user EXEC prompt: `Router>`

In this step, you can also choose to answer **yes** and continue to use the configuration menu that is provided.

Using the Console and the Management Ports

You can configure your switch router from a direct console connection to the console port or remotely through its management port.

- If you are using a direct console connection, configure your terminal emulation program for 9600 baud, 8 data bits, no parity, and 1 stop bit.
- If you are configuring the management port, you must assign an IP address to any Fast Ethernet or Gigabit Ethernet port on your switch router, which serves as a management port.

For interface configuration instructions, see the "Configuring the Management Port" section on page 3-3.

For further details on configuring ports and lines for management access, refer to the *Cisco IOS Configuration Fundamentals Configuration Guide*.

Modem Support

You can connect a modem to the console port or to the auxiliary port on the switch router. The following settings on the modem are required:

- Enable auto answer mode
- Suppress result codes

You can configure your modem by setting the DIP switches on the modem or by connecting the modem to terminal equipment. Refer to the user manual provided with your modem for the correct configuration information.

Note Because there are no hardware flow control signals available on the console port, the console port terminal characteristics should match the modem settings.

For further details on configuring ports and modems for management access, refer to the *Cisco IOS Configuration Fundamentals Configuration Guide* and *Cisco IOS Dial Solutions Configuration Guide.*

Modem Support for Recovering a System Image

The Catalyst 2948G-L3 and the Catalyst 4908G-L3 support Xmodem and Ymodem protocols. If all of the system images in the boot flash memory are somehow damaged or erased, you can copy an image from a local or remote computer (such as a PC, UNIX workstation, or Macintosh computer) using the

Xmodem or Ymodem protocols. The Xmodem and Ymodem protocols support different speeds of file transfers. The maximum file transfer speed supported is 57600 baud. This functionality primarily serves as a disaster recovery technique where system images are recovered using Xmodem and Ymodem commands on the ROM monitor from the console port on your switch router.

See the "Recovering a System Image Using Xmodem and Ymodem" section on page 3-11.

About Passwords

There are two types of passwords.You can configure both an enable password and an enable secret password. For maximum security, the enable password should be different from the enable secret password.

- Enable password—The enable password is a nonencrypted password. It can contain any number of uppercase and lowercase alphanumeric characters. Give the enable password only to users permitted to make configuration changes to the switch router.
- Enable secret password—The enable secret password is a secure, encrypted password. By setting an encrypted password, you can prevent unauthorized configuration changes. On systems running Cisco IOS, you must type in the enable secret password before you can access global configuration mode.You must type in the enable secret password to access boot ROM software.

  An enable secret password can contain from 1 to 25 uppercase and lowercase alphanumeric characters. The first character cannot be a number. Spaces are valid password characters. Leading spaces are ignored; trailing spaces are recognized.

You will configure passwords in the next section, "Configuring the Management Port."

Configuring the Management Port

The management port on the switch router allows multiple simultaneous Telnet or SNMP network management sessions. Since there is no separate management port on the Layer 3 switch routers, you can configure any Fast Ethernet or Gigabit Ethernet port as a management port.

You can remotely configure the switch router through the management port, but first you must configure an IP address so that the switch router is reachable. You can manually configure the management port interface from the command-line interface (CLI).

Note Before you begin to configure the management port interface manually, obtain the switch router's IP address and IP subnet mask. Also make sure the console cable is connected to the console port.

You can configure the management port from an IP connected network. To obtain remote management access using Telnet, use the following steps:

	Command	Purpose
Step 1	Router> **enable** Router#	Enters enable mode. The # prompt indicates enable mode.
Step 2	Router# **configure terminal** Router(config)#	Enters global configuration mode. You can also abbreviate the command to **config terminal**. The Router(config)# prompt indicates that you are in global configuration mode.
Step 3	Router(config)# **enable password** *password*	Sets the enable password. See the "About Passwords" section on page 3-3.
Step 4	Router(config)# **enable secret** *password*	Enters an enable secret password. Once set, a user must enter the enable secret password to gain access to global configuration mode.
Step 5	Router(config)# **interface** *type number* Router(config-if)#	Enters interface configuration mode on the Ethernet interface. You can use any Fast Ethernet interface 1-48 or any Gigabit Ethernet interface 49-50 on the Catalyst 2948G-L3 or any Gigabit Ethernet interface 1-8 on the Catalyst 4908G-L3 to configure the management port.
Step 6	Router(config-if)# **ip address** *ip-address subnetmask*	Enters the IP address and IP subnet mask for the interface specified in Step 5.
Step 7	Router(config-if)# **no shutdown**	Enables the interface.
Step 8	Router(config-if)# **exit** Router(config)#	Returns to global configuration mode.
Step 9	Router(config)# **line vty** *line-number* Router(config-line)#	Enters line configuration mode for virtual terminal connections. Commands entered in this mode control the operation of Telnet sessions to the switch router.
Step 10	Router(config-line)# **password** password	Enters a password for Telnet sessions.
Step 11	Router(config-line)# **end** Router#	Returns to privileged EXEC mode.
Step 12	Router# **copy running-config startup-config**	Saves your configuration changes to NVRAM.

Note Any Fast Ethernet interface 1-48 and any Gigabit Ethernet interface 49-50 on the Catalyst 2948G-L3 switch router, or any Gigabit Ethernet interface 1-8 on the Catalyst 4908G-L3 switch router, can be configured as a management port.

Your switch router should now be operating correctly. You can now use Telnet to remotely assign and verify configurations.

You can display the configuration file when you are in privileged EXEC (enable) mode.

- To see the current operating configuration, enter the following command at the enable prompt:

```
Router# show running-config
```

- To see the configuration in NVRAM, enter the following command:

```
Router# show startup-config
```

If you made changes to the configuration, but did not yet write the changes to NVRAM, the results of the **show running-config** will differ from the results of the **show startup-config** command.

Configuring the Host Name

In addition to the system passwords and enable password, your initial configuration should include the host name to make it easier to configure and troubleshoot the switch router. To configure the host name, use the following steps beginning in enable mode:

	Command	Purpose
Step 1	Router# **configure terminal** Router(config)#	Enters global configuration mode.
Step 2	Router(config)# **hostname** *name-string*	Enters a system name. In this example, we set the hostname to "Router."
Step 3	Router(config)# **end** Router#	Returns to privileged EXEC mode.
Step 4	Router# **copy running-config startup-config**	Copies your configuration changes to NVRAM.

Using the Boot Flash Memory SIMM

The Catalyst 2948G-L3 and Catalyst 4908G-L3 switch routers use the onboard boot flash memory as the file storage system. The boot flash memory SIMM stores a copy of the switch router's software image. This section describes how to use the boot flash memory SIMM to perform the following system administration tasks:

- Viewing the Contents of Boot Flash Memory
- Deleting Files from Boot Flash Memory
- Backing Up a System Image to a TFTP Server
- Copying a System Image from a TFTP Server to a Boot Flash Memory SIMM
- Erasing Files from a Full Boot Flash Memory SIMM

Viewing the Contents of Boot Flash Memory

You can perform the following tasks with the associated commands to view the contents of the onboard boot flash memory SIMM:

- To determine which file system device you are accessing, use the print working directory (**pwd)** command.

```
Router# pwd
bootflash:
```

- To list the directory contents of any boot flash memory media, use the **dir** [*bootflash:*] command.

```
Router# dir
Directory of bootflash:/

  1  -rw-     3153784              <no date>  cat2948g-in-mz.old
  2  -rw-     3153932              <no date>  cat2948g-in-mz

16777216 bytes total (7315372 bytes free)
Router#
```

Deleting Files from Boot Flash Memory

When you delete a file from boot flash memory, the system marks the file as deleted. Deleted files cannot be recovered. The boot flash memory is not released after the image file has been deleted, only the image file is marked as deleted.

Caution When deleting files from memory, be careful not to delete all the system images. You should always retain one known good image as a backup image.

To delete a file, use the **delete** command. The following example demonstrates how a specified image file is deleted using the **delete** command.

```
Router# dir
Directory of bootflash:/

  1  -rw-     3153784              <no date>  cat2948g-in-mz.old
  2  -rw-     3153932              <no date>  cat2948g-in-mz

16777216 bytes total (7315372 bytes free)
Router# delete cat2948g-in-mz.old
Delete filename [cat2948g-in-mz.old]?
Delete bootflash:cat2948g-in-mz.old? [confirm]
Router# dir
Directory of bootflash:/

  2  -rw-     3153932              <no date>  cat2948g-in-mz

16777216 bytes total (7315372 bytes free)
```

Backing Up a System Image to a TFTP Server

To create a backup copy of your system image, you can copy system images from boot flash memory to a Trivial File Transfer Protocol (TFTP) server.

In some implementations of TFTP, you must create a dummy file on the TFTP server and give it read, write, and execute permissions before copying the file over it. Refer to your TFTP documentation for more information.

Tips Before you copy software between the network server and boot flash memory in the switch router, do the following:
– Make sure you have access to the network server, and obtain its IP address and name.
– Verify that the server has sufficient room to accommodate the Cisco IOS software image.
– Check the filename requirements and file space of the network server.

To create a backup of the system software on a TFTP server, use the following steps beginning in privileged EXEC mode:

	Command	Purpose
Step 1	Router# **dir bootflash:**	Displays the contents of boot flash memory, including the names of the images that currently reside there. Note the name of the image file you want to copy.
Step 2	Router# **copy bootflash: tftp:**	Copies a file from boot flash memory to a TFTP server. Be sure to include a colon at the end of the tftp parameter as shown in this example.

The following example demonstrates copying a specified system image file from the boot flash memory to the default TFTP server:

```
Router# dir bootflash:
Directory of bootflash:/

  1  -rw-     3173128              <no date>  cat2948g-in-mz.120-7.W5.14.45
  2  -rw-     3173364              <no date>  cat2948g-in-mz.120-7.W5.14.46

16777216 bytes total (10430596 bytes free)
Router# copy bootflash: tftp:
Source filename []? cat2948g-in-mz.120-7.W5.14.46
Address or name of remote host []? 171.10.0.111
Destination filename [cat2948g-in-mz.120-7.W5.14.46]? yes
!!.!.!!!!!!!!!.!!!!!!!!!.!.!!!!!!!!!.!.!!.!.!!!!!!!!!.!.!.!!!!!!!!!.!!!!!!!!!.!!
!!!!!!!!.!.!!!!!!!!!.!!!!!!!!!!.!!!!!!!!!.!!!!!!!!!.!!!!!!!!!.!.!.!!!!!!!!!.!!.!
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!!!
3173364 bytes copied in 743.840 secs (4271 bytes/sec)
```

Copying a System Image from a TFTP Server to a Boot Flash Memory SIMM

You can copy system image files from a TFTP server to the boot flash memory SIMM for use in booting the switch router.

It is a good idea to have a copy of the current system image on the boot flash memory SIMM in case the new image file that you copy from the TFTP server is corrupted.

Note You can also create a backup copy of your system image by copying the system image from boot flash memory to a Trivial File Transfer Protocol (TFTP) server. You can maintain a known good image as a backup image on the TFTP server. In case the new image file you copy from the TFTP server is corrupted, you can then retrieve the known good backup copy of the system image file from the TFTP server.

Use the following commands to copy the system image from the TFTP server to a boot flash memory SIMM beginning in privileged EXEC mode:

	Command	Purpose
Step 1	Router# **dir bootflash:**	Displays the contents of boot flash memory, including the names of the images that currently reside there.
Step 2	Router# **copy tftp: bootflash:**	Copies a file from a TFTP server to boot flash memory.

The following example demonstrates copying a system image from the TFTP server to the boot flash memory SIMM without erasing the previous image file.

```
Router# dir bootflash:
Directory of bootflash:/

  1  -rw-     3173128              <no date>  cat2948g-in-mz.120-7.W5.14.45

→ 16777216 bytes total (13604024 bytes free)
Router# copy tftp: bootflash:
Address or name of remote host [172.10.00.00]?
Source filename [domino/cat2948g-in-mz.120-7.W5.14.45]? domino/cat2948g-in-mz.12
0-7.W5.14.46
Destination filename [cat2948g-in-mz.120-7.W5.14.46]?
Accessing tftp://172.10.00.00/domino/cat2948g-in-mz.120-7.W5.14.46...
→ Erase bootflash: before copying? [confirm] no
Loading domino/cat2948g-in-mz.120-7.W5.14.46 from 172.10.00.00 (via FastEthernet
1): !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!
!
[OK - 3173364/6345728 bytes]

Verifying checksum...  OK (0x755F)
→ 3173364 bytes copied in 210.364 secs (15111 bytes/sec)
```

```
Router# dir bootflash:
Directory of bootflash:/

  1  -rw-     3173128              <no date>  cat2948g-in-mz.120-7.W5.14.45
  2  -rw-     3173364              <no date>  cat2948g-in-mz.120-7.W5.14.46

16777216 bytes total (10430596 bytes free)
```

Note To retain existing images on boot flash, enter **no** when you are prompted to confirm erasing boot flash.

Erasing Files from a Full Boot Flash Memory SIMM

In the event that the boot flash memory is full, you must erase all the files in the boot flash memory file system before copying a new image file from the TFTP server.

Note When boot flash memory is full, it is important to first make a copy of a known good image file, and then copy a new system image file. In case the new image file you copy from the TFTP server is corrupted, you can revert to the copy of the known good system image file. For a detailed example on how to first make a copy of a known good image file, and then copy a new system image file, refer to the "Copying the System Image to the Switch Router" section on page 3-14.

Use the following commands to first erase and clean boot flash memory and then copy the new system image from the TFTP server to boot flash memory beginning in privileged EXEC mode:

	Command	Purpose
Step 1	Router# **dir bootflash:**	Displays the contents of boot flash memory, including the names of the images that currently reside there.
Step 2	Router# **copy tftp: bootflash:**	Erases boot flash memory and copies a file from a TFTP server to boot flash memory.

The following example demonstrates how to first erase and clean boot flash memory and then copy the new system image from the TFTP server to the boot flash memory SIMM.

```
Router# dir bootflash:
Directory of bootflash:/

  1  -rw-     3168032              <no date>  pci-fix
  2  -rw-     1858797              <no date>  domino-diag.f1
  3  -rw-     3166692              <no date>  cat2948g-in-mz.120-7.WX5.14.27
  4  -rw-     3172268              <no date>  cat2948g-in-mz.120-7.W5.14.42
  5  -rw-     3173128              <no date>  cat2948g-in-mz.120-7.W5.14.45

16777216 bytes total (2237976 bytes free)
Router# copy tftp bootflash:
Address or name of remote host []? 172.10.00.00
Source filename []? domino/cat2948g-in-mz.120-7.W5.14.46
Destination filename [cat2948g-in-mz.120-7.W5.14.46]?
Accessing tftp://172.10.00.00/domino/cat2948g-in-mz.120-7.W5.14.46...
Erase bootflash: before copying? [confirm] yes
Erasing the bootflash filesystem will remove all files! Continue? [confirm] yes
Erasing device... eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee
ee ...erased
Erase of bootflash: complete
Loading domino/cat2948g-in-mz.120-7.W5.14.46 from 172.10.00.00 (via FastEthernet
1): !!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!
!!!!!
[OK - 3173128/6345728 bytes]

Verifying checksum...  OK (0x799F)
3173128 bytes copied in 177.668 secs (17927 bytes/sec)
Router# dir bootflash:
Directory of bootflash:/

  1  -rw-     3173128              <no date>  cat2948g-in-mz.120-7.W5.14.46

16777216 bytes total (13604024 bytes free)
```

Note To erase a full boot flash, enter **yes** when you are prompted to confirm erasing boot flash.

Recovering a System Image Using Xmodem and Ymodem

If you do not have access to a network server and need to download a system image, you can copy an image from a local or remote computer (such as a PC, UNIX workstation, or Macintosh computer) using the Xmodem or Ymodem protocols. This functionality primarily serves as a disaster recovery technique. See Figure 3-1.

Xmodem and Ymodem are common protocols used for transferring files and are included in applications such as Windows 3.1 (TERMINAL.EXE), Windows 95 (HyperTerminal), Windows NT 3.5x (TERMINAL.EXE), Windows NT 4.0 (HyperTerminal), and Linux UNIX freeware (minicom).

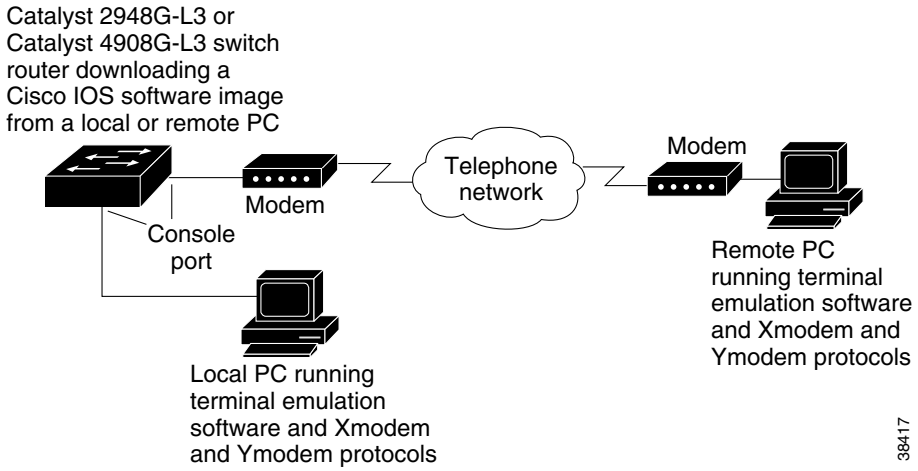
Xmodem and Ymodem downloads are slow, so you should use them only when you do not have access to a network server. You can speed up the transfer by setting the transfer port speed to 57600 bps.

If all local system images are damaged or erased on your switch router, you can perform the file transfer by using the ROM monitor. On the Catalyst 2948G-L3 and the Catalyst 4908G-L3, you can only perform the file transfer from the ROM monitor over the console port.

Note Perform file transfer from the ROM monitor with either Cisco IOS Release 12.0(7)W5(15a) or later. To verify the ROM monitor version, use either the **show version** command from Cisco IOS software or issue the **reset** command from ROM MON mode.

Figure 3-1 shows file transfer using the Xmodem or Ymodem protocols. The connection is from either a local or a remote computer to your switch router. You can make the connection using either the COM port on the local computer or using a modem with the remote computer.

Figure 3-1 Transferring a System Image to a Layer 3 Switch Router Using Xmodem and Ymodem Protocols



To copy a Cisco IOS image from a computer or workstation to a router using the Xmodem or Ymodem protocol, use the following commands:

Command	Purpose
xmodem [**-c** | **-y** | **-s**]	Copies a system image from a computer to DRAM using the ROM monitor. The **-c** option provides CRC-16 checksumming; **-y** uses the Ymodem protocol; and **-s** sets the console port data rate or speed. Speeds range from 1200 bps to 57600 bps.

The computer from which you transfer the Cisco IOS image must be running terminal emulation software and the Xmodem or Ymodem protocol.

Xmodem Transfer Example Using the ROM Monitor

This example shows a file transfer using the ROM monitor and the Xmodem protocol. To transmit with the Ymodem protocol, use the **xmodem -y** command.

The Catalyst 2949G-L3 and the Catalyst 4908G-L3 switch routers must have enough DRAM to hold the IOS image file being transferred. The transferred IOS image runs only in DRAM and cannot be stored in boot flash memory. Once your switch router boots up with the transferred image, you can copy a good IOS image from a TFTP server onto the boot flash file system.

Caution A modem connection from the telephone network to your console port introduces security issues that you should consider before enabling the connection. For example, remote users can dial into your modem and access the router's configuration settings.

To download an IOS image from ROM monitor (using the Xmodem and Ymodem protocols), use the following steps:

Step 1 Place a Cisco IOS software image on the remote computer's hard drive. You can download an image from Cisco Connection Online.

Step 2 Transfer either from a remote or a local computer.

- To transfer from a remote computer, connect a modem to the console port of your switch router and to the standard telephone network. The modem and console port must communicate at the same speed, which can be from 1200 to 57600 bps, depending on the speed supported by your modem. Use the **confreg** ROM monitor command to configure the console port transmission speed for the switch router. You can also set the transmission speed with the **-s** option.

Note We recommend that you use the maximum speed of 57600 bps.The size of an IOS image is approximately 3MB and takes about 10 minutes to transfer at 57600 bps.

Connect a modem to the remote computer and to the telephone network. The remote computer dials through the telephone network and connects to the router.

- To transfer from a local computer, connect the router's console port to a COM port (serial port) on the computer, using a null-modem cable. The console port speed configured on the router must match the transfer speed configured on the local computer.

Note If you are transferring from a local computer, you may need to configure the terminal emulation program to ignore RTS/DTR signals.

You see a ROM monitor prompt in the terminal emulation window:

```
rommon >
```

Step 3 Enter the **xmodem** ROM monitor command. The image is downloaded to DRAM and normally executes on completion of the file transfer. The **-c** option specifies CRC-16 checksum, which is more thorough than a standard checksum, if supported by your computer.

The following example shows how to use the **xmodem** command to transfer an IOS image in ROM monitor:

```
rommon > xmodem -y -s57600
Do not start sending the image yet...
Invoke this application for disaster recovery.
Do you wish to continue? y/n  [n]: yes

Note, if the console port is attached to a modem, both the
console port and the modem must be operating at the same baud
rate. Use console speed 57600 bps for download [confirm]

Download will be performed at 57600. Make sure your terminal
emulator is set to this speed before sending file.
Ready to receive file ...
```

Step 4 Start an Xmodem send operation, which is initiated from the terminal emulation software on the local or remote computer that is sending the system image to the router. Refer to your emulation software application's manual for instructions on how to execute an Xmodem file transfer.

Step 5 Reset the speed on the terminal emulator back to 9600 bps once you complete the transfer of the IOS image into DRAM.

You see the following output upon completion of the IOS image transfer:

```
Returning console speed to 9600.

Please reset your terminal emulator to this speed...
 and hit 'y' to continue
```

Note The remote connection breaks when you reset the speed on the terminal emulator.

Step 6 Disconnect the modem from the console port and reconnect the terminal line. Enter **yes** to continue. Your switch router automatically reboots with the IOS image.

Step 7 Download an image from CCO onto the boot flash file system after your switch router reboots.

Updating the System Image

This section provides minimal instructions for updating the system image on your Layer 3 switch router. This procedure assumes that you are manually booting the switch router from a system image on the boot flash memory SIMM. You can also configure the switch router to boot automatically from a system image specified in the BOOT environment variable. For additional information on booting options and maintaining system images, refer to the Cisco IOS *Configuration Fundamentals Configuration Guide.*

To update the system software, use the following steps:

Step 1 Download the system image from CCO.

Step 2 Copy the system image to the switch router.

Step 3 Reload the switch router with the new image.

Downloading System Images from CCO

Cisco IOS system images, along with other software, are available from the Software Center on Cisco Connection Online (CCO) at http://www.cisco.com. You can download system images from CCO using your browser's FTP capability, using conventional FTP, or using CCO's asynchronous dial-up interface.

For instructions on accessing and downloading software from CCO, refer to the *Software Downloading from CCO via World Wide Web* publication at the Software Center on CCO.

Copying the System Image to the Switch Router

You can copy the system image to the switch router using TFTP, FTP, or RCP. If the system you used to download the image from CCO does not function as a TFTP, FTP, or RCP server, you must first copy the file to an intermediate server that provides those services to your switch router.

Note Before copying the system image from the server to the switch router, check the size of the file to make sure you will have enough room for it in your switch router's boot flash memory. On UNIX file systems, use the **ls -la** command from the directory where the file is stored to display the file size.

In the event that the boot flash memory is full, you must erase all the files in the boot flash memory file system before copying a new image file from the TFTP server. In addition, before you copy a new image from the TFTP server, you must first download a copy of your known good image. In case the new image file you copy from the TFTP server is corrupted, you can revert to the known good image.

To copy both the known good system image and the new system image from a TFTP server to the file system on your switch router, initiate a Telnet session or console connection to the switch router. Perform the following steps in privileged EXEC mode:

	Command	Purpose
Step 1	Router# **dir bootflash:**	Displays the contents and available space in boot flash memory. If there is not enough free space to copy the new system image, perform steps 2 through 5. Otherwise, proceed to Step 4.
Step 2	Router# **copy tftp: bootflash:**	Erases boot flash memory and copies a file from a TFTP server to boot flash memory. Make sure you copy the known good system image file.
Step 3	Router# **dir bootflash:**	Displays the contents of boot flash memory. This step confirms that space was available in boot flash memory and the known good image file was copied as expected. You can now proceed with downloading the latest image.
Step 4	Router# **copy tftp: bootflash:**	Initiates a TFTP session to copy the new system image from the TFTP server.
Step 5	Router# **dir bootflash:**	Displays the contents of boot flash memory. This step confirms that the latest image file was copied as expected.

The following example shows how to erase a full boot flash memory file system, copy a known good image, and copy the latest image using TFTP:

```
Router# dir bootflash:
Directory of bootflash:/

  1  -rw-     3168032             <no date>  pci-fix
  2  -rw-     1858797             <no date>  domino-diag.f1
  3  -rw-     3166692             <no date>  cat2948g-in-mz.120-7.WX5.14.27
  4  -rw-     3172268             <no date>  cat2948g-in-mz.120-7.W5.14.42
  5  -rw-     3173128             <no date>  cat2948g-in-mz.120-7.W5.14.45

→ 16777216 bytes total (2237976 bytes free)
Router# copy tftp bootflash:
Address or name of remote host []? 172.10.00.00
Source filename []? domino/cat2948g-in-mz.120-7.W5.14.45
Destination filename [cat2948g-in-mz.120-7.W5.14.45]?
%Warning:There is a file already existing with this name
→ Do you want to over write? [confirm] yes
Accessing tftp://172.10.00.00/domino/cat2948g-in-mz.120-7.W5.14.45...
→ Erase bootflash: before copying? [confirm] yes
→ Erasing the bootflash filesystem will remove all files! Continue? [confirm] yes
Erasing device... eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee
ee ...erased
Erase of bootflash: complete
Loading domino/cat2948g-in-mz.120-7.W5.14.45 from 172.10.00.00 (via FastEthernet
1): !!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!
!!!!!
[OK - 3173128/6345728 bytes]
```

```
Verifying checksum...  OK (0x799F)
3173128 bytes copied in 177.668 secs (17927 bytes/sec)
Router# dir bootflash:
Directory of bootflash:/

  1  -rw-     3173128              <no date>  cat2948g-in-mz.120-7.W5.14.45

16777216 bytes total (13604024 bytes free)
Router# copy tftp: bootflash:
Address or name of remote host [172.10.00.00]?
Source filename [domino/cat2948g-in-mz.120-7.W5.14.45]? domino/cat2948g-in-mz.12
0-7.W5.14.46
Destination filename [cat2948g-in-mz.120-7.W5.14.46]?
Accessing tftp://172.10.00.00/domino/cat2948g-in-mz.120-7.W5.14.46...
Erase bootflash: before copying? [confirm] no
Loading domino/cat2948g-in-mz.120-7.W5.14.46 from 172.10.00.00 (via FastEthernet
1): !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!
[OK - 3173364/6345728 bytes]

Verifying checksum...  OK (0x755F)
3173364 bytes copied in 210.364 secs (15111 bytes/sec)
Router# dir bootflash:
Directory of bootflash:/

  1  -rw-     3173128              <no date>  cat2948g-in-mz.120-7.W5.14.45
  2  -rw-     3173364              <no date>  cat2948g-in-mz.120-7.W5.14.46

16777216 bytes total (10430596 bytes free)
```

Note Make sure that the file size of the image file you copied to boot flash memory matches the image file size on the server.

Reloading the Switch Router

When the configuration register is set for manual booting, issuing the **reload** command causes the system to enter ROM monitor mode, where you enter the **boot** command and the name of the system image to use. To perform this procedure, you must be connected to the console port, which provides access to the switch router when in ROM monitor mode. For automatic booting, you can issue the **reload** command from an Ethernet connection to the route processor.

Note This procedure assumes that you need to change the boot field in the configuration register from its default value so that the system reverts to ROM monitor mode when you issue the **reload** command.

To reload the switch router with the new system image in boot flash memory, perform the following steps, beginning in global configuration mode:

	Command	Purpose
Step 1	Router(config)# **config-register 0x0**	Sets the configuration register for manual booting from ROM monitor mode.[1]
Step 2	Router(config)# **end** Router#	Returns to privileged EXEC mode.
Step 3	Router# **copy system:running-config nvram:startup-config**	Saves your configuration changes to NVRAM.
Step 4	Router# **reload** rommon 1>	Initiates a reload of the system software. You then enter ROM monitor mode.
Step 5	rommon 1> **dir boot flash:**	Displays the contents of the file system. Perform this optional step to display and copy the name of the system image to the clipboard for use in Step 6.
Step 6	rommon 1> **boot boot flash:***filename*	Reboots the switch router with the new system image. You can paste the filename from the clipboard if you copied it in Step 5.
Step 7	Router> **show version**	Displays the system software version information. Use this step to confirm that the system is loaded with the expected software version.

1. For details on using the configuration register to set boot parameters, refer to the Cisco IOS *Configuration Fundamentals Configuration Guide*.

The following example shows setting the configuration register, saving the configuration, and reloading the switch router with the new image on the boot flash memory SIMM.

```
Router# configure terminal
Router(config)# config-register 0x0
Router(config)# end
Router#
4d00h: %SYS-5-CONFIG_I: Configured from console by console
Router#copy system:running-config nvram:startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
Router# reload
Proceed with reload? [confirm]

rommon 1 > dir bootflash:
         File size           Checksum   File name
   3173128 bytes (0x306b08)   0x799f    cat2948g-in-mz.120-7.W5.14.45
   3173364 bytes (0x306bf4)   0x755f    cat2948g-in-mz.120-7.W5.14.46
rommon 2 > boot bootflash:cat2948g-in-mz.120-7.W5.14.46
Self decompressing the image : ##################################################
################################################################################
################################################################################
################################################################## [OK]

<The system boots>
```

```
Router> show version
Cisco Internetwork Operating System Software
IOS (tm) L3 Switch/Router Software (CAT2948G-IN-M), Version 12.0(7)W5(14.46)  IN
TERIM TEST SOFTWARE
Copyright (c) 1986-2000 by cisco Systems, Inc.
Compiled Tue 22-Feb-00 04:31 by
Image text-base: 0x60010928, data-base: 0x605B2000
```

Now that you have completed the initial configurations on your Layer 3 switch router, you can begin configuring the interfaces. See Chapter 4, “Configuring Interfaces.”